

REMARKS

Claims 12, 14-15, 17, and 19-20 are pending in this application. Claims 1-11, 13, 16, and 18 are canceled. Claims 12, 14-15, and 17 are amended. No new matter has been added. Applicants respectfully request reconsideration and review of the application in view of the foregoing amendments and the following remarks.

Before addressing the merits of the rejections based on prior art, a brief description of the present invention is provided. The present invention provides an improved apparatus for controlling the speed of a model train using a control knob. In one prior art method for controlling the speed of a model train, the user turns a knob to increase or decrease the power delivered to the train; the amount of power delivered depends on the rotational position of the knob. The disadvantage of this method is a lack of granularity over the control of speed. In another prior art method for controlling train speed, a user operates a control wheel that can be rotated continuously in either direction with no fixed starting or stopping point; each revolution of the wheel in a forward (or backward) direction increases (or decreases) the power delivered to the train by a corresponding amount. The advantage of this method is that it confers greater granularity over the control of speed, but it requires more physical effort (i.e., more turning of the knob) to achieve a higher speed, which delays the responsiveness of the train.

The present invention provides for an apparatus that can control the speed of a model train based upon the speed of rotation of a control knob. A processor receives electrical pulses that indicate the rotation of the knob. The processor calculates the amount of power to deliver to the train based on the number of electrical pulses received and the elapsed time between these pulses. Through the use of two optical detectors, the apparatus is also configured to detect the direction of rotation of the knob, where the processor finds the phase difference between pulses generated from the two detectors. The present invention allows the user to rapidly exercise precise control over a wide range of speeds and to control the direction of the train using a single knob in

conjunction with the two optical detectors. Applicants have amended the claims to clarify these and other aspects of the invention.

§ 103 Rejections

The Examiner rejected Claims 12, 14, 15, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Young et al. in view of Koogler and further in view of Nojima et al. Claims 12, 14, and 15 are amended. Applicants respectfully traverse the rejections.

Standard for a Rejection of Obviousness

A *prima facie* rejection for obviousness requires: (1) a disclosure or suggestion of every element of the claim in the cited reference or references; (2) a suggestion or motivation, in the references or known to one skilled in the art, to modify or combine the references; and (3) a reasonable expectation of success. The suggestion to combine and the reasonable expectation of success must be found in the prior art. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Moreover, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000); *In re Lee*, 277 F.3d 1338, 1342-44 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347 (Fed. Cir. 1992). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680

(Fed. Cir. 1990).

A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308 (Fed. Cir. 1999) (the level of skill in the art cannot be relied upon to provide the suggestion to combine references.).

Applicants respectfully submit that each of the following rejections of claims fails to satisfy these standards.

Young et al.

Young et al. is directed toward a controller for model trains on a track. As shown in Fig. 2, the controller has multiple inputs, including a dial for controlling the speed of the train and various buttons for controlling other aspects of the train. The speed of the train is controlled by the rotational position of the dial 36, and the direction button 38 allows the direction of the train to be changed. See col. 6, lines 39-46. The Examiner acknowledges that there are numerous deficiencies with Young et al. For example, Young et al. fails to disclose: (1) detecting the speed of the rotation of the knob for a period of about 50 ms or less; (2) a light source; (3) a rotatable disk in communication with the knob and intervening between the light source and the detector; and (4) a processor configured to correlate knob rotational speed with a magnitude of power provided from a source to a model vehicle by multiplying a distance of rotation of the knob based upon speed of knob rotation. As amended, Claim 12 currently includes (5)

a second optical detector and (6) detecting a direction of knob rotation based upon a phase difference between electrical signals produced from the first and second optical detectors. The Examiner acknowledges that Young et al. fails to disclose these limitations as well. See page 4 of the most recent Office Action. The Examiner proposes to combine Koogler, Nojima et al., and Nelson with Young et al. to make up for these deficiencies.

As a fundamental matter, there is no teaching or suggestion for the proposed combination of references. The deficiencies the Examiner identified are significant and not easily cured by the proposed combination of references. The specification of the present invention actually refers to Young et al. in the "Background of the Invention" section. See paragraph 0009 on page 2 of the specification ("U.S. Patents Nos...5,749,547 issued to Neil Young et al. show such a system...."). As noted in the "Background of the Invention" section, Young et al. discloses the prior art method of using a rotating control wheel to control train velocity. The control wheel can be rotated continuously in either direction with no fixed starting or stopping point. The system allows for greater granularity over the control of velocity but at the cost of delayed responsiveness and excessive physical manipulation. See paragraphs 0010-0012 on pages 2-3 of the specification.

The present invention provides an improved way for controlling the velocity of a model train to maintain high granularity while improving responsiveness and limiting excessive rotation of the control wheel. The present invention relies on detecting a speed of rotation of the knob over a period of about 50 milliseconds or less. The processor is configured to correlate knob rotational speed with a magnitude of power provided from a power source to a model vehicle by multiplying a distance of rotation of the knob by a factor based upon speed of knob rotation. The processor is also configured to detect a direction of knob rotation based upon a phase difference between electrical signals produced from the two optical detectors. The present invention differs from Young et al. in many respects, and the Examiner acknowledges that Young et al.

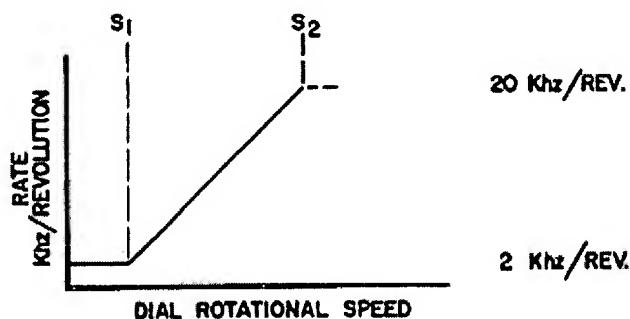
fails to disclose the key features of the present invention.

Koogler

Koogler is directed toward a variable rate tuning circuit for a radio. The tuning circuit provides for fine resolution when a dial is rotated slowly and provides for larger changes in frequency when the dial is rotated quickly. As was discussed in Applicants' previous response, the tuning circuit of Koogler includes an integrator circuit that produces an output based upon the integration of a series of pulses previously received from the control knob. See col. 4, lines 58-63.

Regarding the first requirement for a *prima facie* rejection for obviousness, Koogler fails to disclose all of the elements that the Examiner intends for Koogler to disclose in order to make up for the deficiencies of Young et al. The Examiner contends that Koogler discloses determining a rate of rotation of a rotating control wheel over range of 50 ms or less. The Examiner cites to col. 3, lines 38-40 and to Fig. 2, which according to the Examiner "shows determining the rate from 0 to s_1 , 0 being less than 50 ms." See page 2 of the most recent Office Action. The Examiner, however, is misreading the graph shown in Fig. 2, which is reproduced below:

FIG-2



As shown in Fig. 2, the x-axis of the graph represents "dial rotational speed," and s_1 marks a rotational speed at which "pulses generated by the pulse generator 20...are effective in changing frequency." See col. 3, lines 38-42. Thus, s_1 is **not** related to elapsed time, and Koogler fails to disclose detecting a speed of rotation of a knob over

a period of about 50 milliseconds or less.

Regarding the second requirement for a *prima facie* rejection for obviousness, Koogler cannot be properly combined with Young et al. The Examiner states the motivation to combine is as follows:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Young et al. to use the transmitters of Koogler and Nojima et al. in order to control the speed and power.

See page 3 of the Office Action. As discussed above, Koogler is directed toward a tuning circuit for radios. The motivation to combine the references is insufficient to meet the foregoing tests established by the Federal Circuit. First, there is no explicit teaching in any of the references of the desirability of such a combination. Young et al. does not suggest a need for a different way of controlling the speed of a model train. Likewise, Koogler, which is directed toward a tuning circuit for a radio, does not suggest using the tuning circuit to control the power delivered to a model train. Second, as to the possibility of an implicit teaching of the desirability of the combination, the Examiner has identified no objective evidence on which to evaluate this consideration.

The only evidence in the record showing recognition of this problem to be solved comes directly from the patent application. Rather than reflecting the knowledge in the prior art, the motivation for the combination comes directly from the patent application itself. As discussed above, the purpose of the present invention is to fill a void in the art "for a model train velocity controller which allows the user to rapidly exercise precise control over a wide range of speeds." See paragraph 0013 on page 3 of the specification. This statement shows that the motivation for the Examiner's proposed combination of prior art references originated with the patent application. The Office Action, therefore, violates the Federal Circuit proscription against reliance on applicant's disclosure for a suggestion or motivation to combine prior art references. See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Nojima et al.

The Examiner further acknowledges deficiencies in the combination of Young et al. and Koogler. Namely, the Examiner recognizes that the proposed combination fails to disclose a rotatable control knob, a light source, an optical detector, and a rotatable disk in communication with the knob intervening between the light source and the detector. As noted above, these are not insignificant deficiencies of the references. Applicants respectfully submit that these references lack these features since they were never intended to provide the solution set forth in the present patent application.

The Examiner proposes to make up for these deficiencies by adding Nojima et al. Nojima et al. is directed towards a rotational operation mechanism that performs a rotation movement in response to operation by a user. The apparatus is designed to be used as a jog dial by DJs to control the playback of a compact disc. The Examiner gave the same motivation to combine Nojima et al. with the Young et al./Koogler combination as was given for combining Young et al. with Koogler:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Young et al. to use the transmitters of Koogler and Nojima et al. in order to control the speed and power.

See page 3 of the Office Action. The Examiner never addresses why someone of ordinary skill in the art would have been motivated to modify the Young et al./Koogler combination with the rotating detection mechanism disclosed by Nojima et al. The tuning circuit of Koogler already includes a mechanism for detecting the rotation of the tuning dial through the output of electrical pulses. Because Koogler already possesses a mechanism for detecting the rotation of the tuning dial, one of ordinary skill of the art would not have looked to use the light emitting unit and light receiving unit disclosed by Nojima et al. to detect rotation. The only motivation for combining the references comes from the present application itself, and as discussed above, this violates the Federal Circuit proscription against reliance on applicant's disclosure for a suggestion or motivation to combine prior art references.

Moreover, Nojima et al. cannot be considered analogous art to Young et al. or

Koogler. To rely on a reference for a rejection under obviousness, the references must also be analogous art. The examiner must determine what is "analogous prior art" for the purpose of analyzing the obviousness of the subject matter at issue. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). While Patent Office classification of references and the cross-references in the official search notes of the class definitions are some evidence of "nonanalogy" or "analogy" respectively, the court has found "the similarities and differences in structure and function of the inventions to carry far greater weight." *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973). See MPEP § 2141.01(a). The jog dial of Nojima et al. differs greatly from the train controller of Young et al. and the tuning circuit of Koogler. The functions disclosed in the three references are all very different--one is for controlling model trains, another is for tuning frequencies in radios, and the last reference concerns the rotational operation mechanism of jog dials used by DJs. Nojima et al. is neither concerned with the Applicants' field of endeavor (i.e., the operation of model trains) nor is it reasonably pertinent to the particular problem with which the inventor was concerned (i.e., improving the control of model trains).

For at least these reasons, the rejections with respect to Claim 12 should be withdrawn.

Nelson et al.

As amended, Claim 12 includes some of the limitations that were found in canceled Claim 16. These limitations include a "second optical detector" and configuring the processor such that it can "detect a direction of knob rotation based upon a phase difference between electrical signals produced from the first and second optical detectors." Claim 12 has also been amended to more specifically address the positioning of the optical detectors, wherein the first and second optical detectors are

positioned at different locations along an outer circumference of the disk.

In the most recent Office Action, the Examiner has already addressed some of the limitations because newly amended Claim 12 includes some of the limitations found in canceled Claim 16. The Examiner acknowledges that Young et al., Koogler, and Nelson et al. fail to disclose a second optical detector positioned at a different location on a disk, where the processor is configured to detect a direction of knob rotation based on a phase difference between electrical signals from the first and second optical detectors.

The Examiner proposes to combine Nelson et al. with the Young et al./Koogler/Nelson et al. combination to make up for these deficiencies. Nelson is directed towards an optical encoder having multiple thumbwheels. These thumbwheels are used in control consoles for lighting systems to allow an operator to enter information into a system by turning the thumbwheels. The motivation given by the Examiner to combine the references is as follows:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Young et al, Koogler, and Nojima et al to use the sensors taught by Nelson et al in order to reduce errors in sensing.

See page 4 of the Office Action. Applicants are unsure how using the sensors of Nelson et al. would reduce the errors in sensing in the combination of Young et al./Koogler/Nojima et al. Nelson et al. does not suggest that the use of two optical transceivers is for solving the problem of reducing errors in sensing. Likewise, Young et al., Koogler, and Nojima et al. all fail to disclose any need for reducing errors in sensing. If anything, the use of two sensors would increase the number of errors in sensing because twice the data needs to be sensed. Even if the Examiner meant that the use of two sensors would allow for error checking and error correction, there is no disclosure or suggestion in Nelson et al. (or any of the references) of using two sensors in this capacity. Thus, there is no motivation to combine Nelson et al. with Young et al./Koogler/Nojima et al.

In any event, Nelson et al. also fails to disclose all of the limitations of newly amended Claim 12. As amended, Claim 12 requires that the first and second optical detectors be positioned at different locations along an outer circumference of the disk. As shown in Fig. 4 of Nelson et al., one of the two optical transceivers (120) is positioned along an outer circumference of the disk while the other optical transceiver (122) is positioned within the inner area of the disk. This is a key distinction because in Nelson et al., two tracks of holes exist in the disk, and these holes need to be offset circumferentially to provide a 90 degree phase shift between the tracks. See col. 4, lines 38-56. Because the present invention requires that the optical detectors be placed along an outer circumference of the disk, only one set of gaps is needed to determine both the speed of rotation of the control knob and direction of rotation of the control knob, and this feature simplifies the construction of the disk.

Claims 14-15, 17, and 19-20 which depend from Claim 12, are deemed patentable for the reasons stated above with respect to Claim 12, and because of the additional limitations set forth therein. Since the prior art references fail to teach or suggest every element of Claims 12, 14-15, 17, and 19-20, Applicant respectfully requests that the rejection of these claims be withdrawn.

Procab Manual

The Examiner additionally rejected Claims 12, 14, and 15 under 35 U.S.C. § 103(a) as being unpatentable over the Procab Manual in view of Koogler and further in view of Nojima et al.¹ Claims 12, 14, and 15 are amended. Applicants respectfully traverse the rejections.

The Procab Manual is directed towards a model train controller that includes

¹ In section 4 of the most recent Office Action, the Examiner actually states "Claims 12, 14, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Procab manual" and does not mention Koogler or Nojima et al. However, the substance of the rejection relies upon both Koogler and Nojima et al., so Applicants assume that the Examiner meant to rely on the combination of the three references as opposed to the Procab Manual alone.

various control buttons and knobs for controlling the direction, momentum, speed, sounds, and lighting of the train. See page 15 of the Procab Manual. The Examiner acknowledges that there are numerous deficiencies with the Procab Manual, and these deficiencies are similar to the deficiencies that the Examiner noted with respect to Young et al.: (1) detecting the speed of the rotation of the knob for a period of about 50 ms or less; (2) a light source; (3) a rotatable disk in communication with the knob; (4) a second optical detector; and (5) detecting a direction of knob rotation based upon a phase difference between electrical signals produced from the first and second optical detectors. The Examiner proposes to add Koogler, Nojima et al., and Nelson et al. to make up for these deficiencies.

As a fundamental matter, there is no teaching or suggestion for the proposed combination of references. The deficiencies the Examiner identified are significant and not easily cured by the proposed combination of references. While the Procab Manual discloses a feature called ballistic tracking, the present invention still differs from the Procab Manual significantly in many key respects, and the Examiner acknowledges that the Procab Manual fails to disclose these key features of the present invention.

Koogler

Koogler is directed toward a variable rate tuning circuit for a radio. The tuning circuit provides for fine resolution when a dial is rotated slowly and provides for larger changes in frequency when the dial is rotated quickly. The tuning circuit of Koogler includes an integrator circuit that produces an output based upon the integration of a series of pulses previously received from the control knob. See col. 4, lines 58-63.

Regarding the first requirement for a *prima facie* rejection for obviousness, Koogler fails to disclose all of the elements that the Examiner intends for Koogler to disclose make up for the deficiencies of the Procab Manual. The Examiner contends that Koogler discloses determining a rate of rotation of a rotating control wheel over range of 50 ms or less. The Examiner cites to col. 3, lines 38-40 and to Fig. 2, which "shows determining the rate from 0 to s1, 0 being less than 50 ms." See page 2 of the

most recent Office Action. The Examiner, however, is misreading the graph shown in Fig. 2, which was reproduced previously. The x-axis of the graph in Fig. 2 represents “dial rotational speed,” and S1 marks a rotational speed at which “pulses generated by the pulse generator 20...are effective in changing frequency.” See col. 3, lines 38-42. Thus, S1 is **not** related to elapsed time, and Koogler fails to disclose detecting a speed of rotation of a knob over a period of about 50 milliseconds or less.

Regarding the second requirement for a *prima facie* rejection for obviousness, Koogler cannot be properly combined with the Procab Manual. The Examiner states the motivation to combine is as follows:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of the Procab Manual to use the transmitters of Koogler and Nojima et al. in order to control the speed and power.

See page 6 of the Office Action. As discussed above, Koogler is directed toward a tuning circuit for radios. The motivation to combine the references is insufficient to meet the foregoing tests established by the Federal Circuit. First, there is no explicit teaching in any of the references of the desirability of such a combination. The Procab Manual does not suggest a need for a different way of controlling the speed of a model trains. Likewise, Koogler, which is directed toward a tuning circuit for a radio, does not suggest using the tuning circuit to control the power delivered to a model train. Second, as to the possibility of an implicit teaching of the desirability of the combination, the Examiner has identified no objective evidence on which to evaluate this consideration.

The only evidence in the record showing recognition of this problem to be solved comes directly from the patent application. Rather than reflecting the knowledge in the prior art, the motivation for the combination comes directly from the patent application itself. As discussed above, the purpose of the present invention is to fill a void in the art “for a model train velocity controller which allows the user to rapidly exercise precise control over a wide range of speeds.” See paragraph 0013 on page 3 of the specification. This statement shows that the motivation for the Examiner’s proposed

combination of prior art references originated with the patent application. The Office Action, therefore, violates the Federal Circuit proscription against reliance on applicant's disclosure for a suggestion or motivation to combine prior art references. See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

In the alternative, the Examiner argues that making use of a period of 50 ms or less for detecting the speed of rotation of the knob would have been obvious. Specifically, the Examiner states:

Also, it would have been obvious to one having ordinary skill in the art at the time the invention was made [to] use a period of about 50 ms or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves on[ly] routine skill in the art (see MPEP 2144.05 (II) (A)).

See page 6 of the Office Action. Applicants, however, respectfully disagree with the Examiner's interpretation of MPEP § 2144.05 (II)(A). The limitation of detecting "a speed of rotation of the knob over a period of about 50 milliseconds or less" does not involve a range in the same sense "range" is being used in the cited section, which refers to concentration ranges or temperature ranges. Rather, "about 50 milliseconds or less" is a key feature that distinguishes the present invention from the prior art. As noted in the response and affidavit filed on March 29, 2006, the controller disclosed in the Procab Manual was not configured for effective operation over time intervals of 50 milliseconds or less. The instability below 50 ms resulted in the Procab device failing to produce output varying at increments below 50 ms. The Procab Manual fails to disclose or suggest detecting a speed of rotation of a knob at about 50 ms or below. It also would not have been obvious to have the device disclosed in the Procab Manual to detect a speed of rotation of a knob at about 50 ms or less because improving the operation of the device would have required a redesign of the device as opposed to mere experimentation. Thus, the rejection with respect to Claim 12 should be withdrawn for at least this reason.

Nojima et al.

The Examiner further acknowledges deficiencies in the combination of the Procab Manual and Koogler. Namely, the Examiner recognizes that the combination fails to disclose a rotatable control knob, a light source, an optical detector, and a rotatable disk in communication with the knob intervening between the light source and the detector. As noted above, these are not insignificant deficiencies of the references.

The Examiner proposes to make up for these deficiencies by adding Nojima et al. Nojima et al. is directed towards a rotational operation mechanism that performs a rotation movement in response to operation by a user. The apparatus is typically used as a jog dial by DJs to control the playback of a compact disc. The Examiner gave the same motivation to combine Nojima et al. with the Procab Manual./Koogler combination as was given for combining the Procab Manual with Koogler:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of the Procab Manual to use the transmitters of Koogler and Nojima et al. in order to control the speed and power.

See page 6 of the Office Action. The Examiner never addresses why someone of ordinary skill in the art would have been motivated to modify the Procab Manual/Koogler combination with the rotating detection mechanism disclosed by Nojima et al. The tuning circuit of Koogler already includes a mechanism for detecting the rotation of the tuning dial through the output of electrical pulses. Because Koogler already possesses a mechanism for detecting the rotation of the tuning dial, one of ordinary skill of the art would not have looked to use the light emitting unit and light receiving unit disclosed by Nojima et al. to detect rotation. The only motivation for combining the references comes from the present application itself, and as discussed above, this violates the Federal Circuit proscription against reliance on applicant's disclosure for a suggestion or motivation to combine prior art references.

Moreover, Nojima et al. cannot be considered analogous art to the Procab Manual or Koogler. To rely on a reference for a rejection under obviousness, the

references must also be analogous art. The examiner must determine what is "analogous prior art" for the purpose of analyzing the obviousness of the subject matter at issue. The jog dial of Nojima et al. differs greatly from the train controller of the Procab Manual and the tuning circuit of Koogler. The functions disclosed in the three references are all very different--one is for controlling model trains, another is for tuning frequencies in radios, and the last reference concerns the rotational operation mechanism of jog dials used by DJs. Nojima et al. is neither concerned with the Applicants' field of endeavor (the operation of model trains) nor is it reasonably pertinent to the particular problem with which the inventor was concerned (improving the control of model trains).

For at least these reasons, the rejections with respect to Claim 12 should be withdrawn.

Nelson et al.

As amended, Claim 12 includes some of the limitations that were included in canceled Claim 16. These limitations include a "second optical detector" and configuring the processor such that it can "detect a direction of knob rotation based upon a phase difference between electrical signals produced from the first and second optical detectors." Claim 12 has also been amended to more specifically address the positioning of the optical detectors, wherein the first and second optical detectors are positioned at different locations along an outer circumference of the disk.

In the most recent Office Action, the Examiner has already addressed some of the limitations because newly amended Claim 12 includes some of the limitations found in canceled Claim 16. The Examiner acknowledges that the Procab Manual, Koogler, and Nelson et al. fail to disclose a second optical detector positioned at a different location on a disk, where the processor is configured to detect a direction of knob rotation based on a phase difference between electrical signals from the first and second optical detectors.

The Examiner proposes to include Nelson et al. with the Procab

Manual/Koogler/Nelson et al. combination to make up for these deficiencies. Nelson is directed toward an optical encoder having multiple thumbwheels. These thumbwheels are used in control consoles for lighting systems to allow an operator to enter information into a system by turning the thumbwheels. The motivation given by the Examiner to combine the references is as follows:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of the Procab Manual, Koogler, and Nojima et al to use the sensors taught by Nelson et al in order to reduce errors in sensing.

See page 7 of the Office Action. Applicants are unsure how using the sensors of Nelson et al. would reduce the errors in sensing in the invention of the Procab Manual/Koogler/Nojima et al. Nelson et al. does not suggest that the use of two optical transceivers is for solving the problem reducing errors in sensing. Likewise, the Procab Manual, Koogler, and Nojima et al. all fail to disclose any need for reducing errors in sensing. If anything, the use of two sensors would increase the number of errors in sensing because twice the data needs to be sensed. Even if the Examiner meant that the use of two sensors would allow for error checking and error correction, there is no disclosure or suggestion in Nelson et al. (or any of the references) of using two sensors in this capacity. Thus, there is no motivation to combine Nelson et al. with the Procab Manual/Koogler/Nojima et al.

In any event, Nelson et al. fails to disclose all of the limitations of newly amended Claim 12. As amended, Claim 12 requires that the first and second optical detectors be positioned at different locations along an outer circumference of the disk. As shown in Fig. 4 of Nelson et al., one of the two optical transceivers (120) is positioned along an outer circumference of the disk while the other optical transceiver (122) is positioned within the inner area of the disk. This is a key distinction because in Nelson et al., two tracks of holes exist in the disk, and these holes need to be offset circumferentially to provide a 90 degree phase shift between the tracks. See col. 4, lines 38-56. Because the present invention requires that the optical detectors be placed along an outer

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circumference of the disk, only one set of gaps is needed to determine both the speed of rotation of the control knob and direction of rotation of the control knob.

Claims 14-15, 17, and 19-20 which depend from Claim 12, are deemed patentable for the reasons stated above with respect to Claim 12, and because of the additional limitations set forth therein. Since the prior art references fail to teach or suggest every element of Claims 12, 14-15, 17, and 19-20, Applicants respectfully request that the rejection of these claims be withdrawn.

* * *

In view of the foregoing, the Applicants respectfully submit that Claims 12, 14-15, 17, and 19-20 are in condition for allowance. If it would be helpful to placing this application in condition for allowance, the Applicants encourage the Examiner to contact the undersigned counsel and conduct a telephonic interview.

To the extent necessary, Applicants petition the Commissioner for a three-month extension of time, extending to May 2, 2007, the period for response to the Office Action dated November 2, 2006. The Commissioner is authorized to charge \$510. for the three-month extension of time pursuant to 37 CFR §1.17(a)(3) and any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0639.

Respectfully submitted,



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